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AN APPROXIMATE METHOD FOR MODELING VEGETATION EFFECTS OVER TERRAIN

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There are currently several models that have been validated that can model radiowave fields over terrain (R.J. Luebbers, *IEEE Ant. and Prop.*, 951-955, 1984, S. Ayasli, *IEEE Ant. and Prop.*, 1013-1023, 1986, A.E. Barrios, *IEEE Ant. and Prop.*, 90-98, 1994). While these models perform adequately when the terrain path is absent of any major vegetation such as trees and large brush, they fail to adequately account for the increased attenuation observed when vegetation is present.

A simple method, implemented in a terrain split-step parabolic equation model (TPEM), is presented in which the ground is modified to approximate the vegetation. The method consists of simply increasing the ground elevation by the height of the intervening trees or brush. This method is particularly useful when the topography of the terrain path is poorly described, in which case the ground elevation can then be adjusted by an average value along the entire path.

An example is shown below in which fields were measured over a 6 km long terrain path at a frequency of 910 MHz (K.A. Chamberlin, R.J. Luebbers, *IEEE Ant. and Prop.*, 1093-1098, 1982). Signals were measured under two conditions, one in which the terrain path was clear, and one in which a grove of trees blocked the propagation path.

